PROJECT IDENTIFICATION AND DEVELOPMENT
SECTOR EAST MUNICIPAL SERVICES
AND INFRASTRUCTURE

TRIP REPORT
MAY 1996

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Introduction

The first trip took place May 14 -25, with Alan Edmond spending about three full work days in Sector East. Principal contacts were the local Serb-Croatian government in Vukovar, the Croat- Croatian government in exile, and the county government in Vukovar. Jim Dohrman overlapped with Edmond for several days. Both wrote conceptual and cost estimate papers for identified projects primarily in potable water, electrical service, and vehicles.

Political and Administrative Conditions in the Vukovar Government and in the Government in Exile

In meeting with the chief of the government in exile it became clear that his greatest priority is the restoration of the water system. Mr. Stengl was the head of the Vukovar water department and had been with it for 25 years, so that emphasis is no surprise. Stengl came across as knowing all the details of the needed repairs, and had definite ideas about how to carry out the long term operation of the water department when he returns. The problem is that if he, with a background in water management only, is to be the mayor, will he be able to administer the other departments and functions effectively? This begs the question of whether the regional administration is the real power, and whether the makeup of the first new municipal government will make much difference as to the overall recovery and capacity-building effort there.

The Serb-run local government in Vukovar has either inherited or created a water system that is suffering from neglect that may be attributable to more than the war damage itself and a lack of operating funds since the war. For example, infiltration of sand into the filtration system may be attributable to poor deployment of staff, pilferage of measuring and testing equipment, and general incompetence. Stengl will assert that set of accusations readily, but it needs to be corroborated.

The regional authorities seem to be in charge on a daily basis, and are quite capable of giving out information selectively. A second series of interviews will better ascertain just who is in each position of authority, and who has a handle on the specifics of infrastructure operations and repairs. Also, it will then be possible to ascertain better who is planning to stay after the "reconciliation" later this year or early in 1997. Being able to draw up a presumptive table of organization with some of the names of key personnel and the likely staffing levels will help greatly in the analysis of municipal capabilities projected for the first new local government.

It is assumed that the Croat Croatians will install their own people, and will of necessity keep some Serb Croatians for political appeasement reasons. Presumably some Serbs now in technical and administrative positions will be kept on at reduced rank. Also, presumably the vast majority of non-skilled and semi-skilled jobs will be purged of Serbian incumbents and Croats will be placed in them wholesale. Only quotas fixed by higher authorities will guarantee bi-ethnicity.

Even more importantly than the uncertainties caused by staffing and leadership issues, the cost estimates presented by Serbian Croatians are suspect on their face (leftover socialist planning calls for overbuilding to avoid failure), and also will be a problem for the Croat Croatians because those plans and costs were prepared by Belgrade firms, and in some cases at least, they specify Yugoslavian equipment. This puts the onus on Jim Dohrman and

subsequent engineers and negotiators to come up with equipment and supply (building materials primarily) estimates that both sides will consider reliable and "neutral".

There are several issue areas that could be troublesome in the long run, and bear some further investigation:

- **The relationship between the regional authority and the municipal government.** During discussions with administrators and staff there seemed to be a close working relationship, but with the county level people clearly receiving deferential treatment from city personnel. Probably the county government is superior for constitutional and party reasons, but it will be useful to identify rising stars in the local government who not only will remain on scene but could rise to county positions if a multi-party system develops.

There is evidence that the county government influences the ways in which municipal services are delivered, through cooperative agreements with other governments and through contracts with "private firms", at least one of which is Yugoslavian. These relationships and arrangements will change drastically with the reconciliation, and part of keeping Vukovar government viable will be to determine which of those contractual arrangements and intergovernmental agreements, if any, will be allowed to continue, and what to do in order to provide uninterrupted service. For example, a Yugoslavian firm provides winter road maintenance service now. That is almost certain to be cut. Also, a Yugoslavian firm now services the one residential trash compactor, with emergency repairs being available. Continuation of emergency repair service for that truck is critical, and cannot be discontinued even briefly unless and until a backup vehicle is purchased.

- **The status of master plans and concept papers.** The Serb government in Vukovar has a master plan for the water system, a master plan for the reconstruction of the historic district, at least a verbal plan for creating a pedestrian zone, a set of options for solid waste disposal, and a damage assessment and replacement plan for portions of the electrical grid. These are in various stages of study and approval by the current local government. some involve tie-ins with regional facilities plans, and some involve the participation of regional study groups. some of these plans and conceptual documents have been before elected bodies, and some have not. It is apparent that a thorough analysis needs to be done for each functional area's plans, and a reality check carried out for technical assumptions and costs in each. For example, a major difference of opinion exists between the current government and the government in exile as to how to provide fire flow and reserve water for the city. The Croats believe that pumping is the answer, and the Serbs want to install four water towers.

It is safe to say that there will be vast differences of opinion as to how technical problems will be solved and how entire systems will be designed. The government in exile has counter plans for many of the Serbs' plans, and will discard the Serbs' work posthaste upon returning to power. There is no telling at this time who is right and who is wrong on most issues, hence the importance of the U.S. engineer and some"neutral" engineers on scene. A case in point is solid waste, which appears to be under control, but for which the Serbs would like to site a new landfill. The Croats, on the other hand, believe that a waste-to-energy plant will be needed in a few years, and they are already planning and costing one to the exclusion of any landfill replacement planning.

A serious complication is the stigma attached by Croats to anything Serbian, including plans and specs as alluded to above. The level of hatred is so high that anything with a Belgrade engineer's stamp will be discarded by the returning Croats. This is despite the examples Dohrman has found of some excellent engineering analysis and design work by Belgrade firms, and Edmond's review of a very good historic reconstruction plan, complete with facade treatments. The ethnic problem simply cannot be overstated as an impediment to rational thinking and cooperation.

- **Number and nature of groups working on the same problems.** Any areas of duplication must be found and managed. Contact needs to be made with the transitional government in Osijek, and follow-up work needs to be carried out with all the Zagreb ministries involved, as well as state monopolies which in some cases may have reconstruction plans on hand. Most notable is the power monopoly which controls the grid that will be reconnected to Sector East.

- **National funding that is in the pipeline.** Stengl reports that there is funding for 3,505 units of new and reconstructed housing for Sector East. Asked twice if this is actual or projected, he said that the funding is now available. A thorough analysis of legislative and ministerial actions and spending bills must be made prior to finalizing any projects with donors to avoid double funding. Certification by recipients and other competent authorities that no other funding is available may be warranted.

- **Transportability of donated assets will be a constant concern.** The Croats in exile report cases of equipment and vehicles disappearing into Bosnia or Serbia or being sold for parts. Obviously the integrity of assets is going to be a constant problem requiring technical controls and administrative oversight. For example, smart electronic devices can be placed in vehicles to disable them as necessary. The UN or another agency can supervise the vehicles and control them when not in use. Stationary components can be labeled and fixed with lead seals. Ownership can be retained by donors or intermediaries until reconciliation has taken hold.

Pilferage and sabotage will be more of a problem than equipment "growing legs," however. Legal safeguards must be put in place with some sanctions for lack of diligence by responsible agencies. Incentives must be provided for policing donated property in a highly effective manner.

- **Contracting out, contracting in, and regional services must be given due consideration in all cases.** Even at the risk of losing time, all avenues need to be pursued in this regard. In order to maximize efficiency and promote cost recovery, each possibility for public/private arrangements must be explored. Special effort may be needed to deal with new representative councils which have no experience in these matters, and with recalcitrant administrators who may see nepotism as a public good for returning Croats, as well as an enhancement of their own powers. Detailed analysis and concerted action in finding innovative and best practice will avoid future grief.

- **Assumptions about the build-out population and distribution within the Vukovar area must be questioned.** Where the repatriated Croats and remaining Serbs live will have obvious implications for the provision of utilities and services and whether certain facilities and services can be phased in. Massive ownership problems aside, those returning to power have plans to reconstruct the flats in the Borovo industrial area, where many of the workers lived before the war. The current Serb government has plans to demolish some residential blocks and reconstruct others. Most of those interviewed believe the build-out population will be 50,000-60,000.

Driving through the villages one can see agricultural activity going on seemingly at full throttle. In the urbanized areas one sees little commercial activity, and no major rebuilding of the industrial complex at Borovo. Some other industries are being restored, and some are seemingly intact physically but inactive.

Reconstruction policy will be complex to say the least, and will have profound implications for the utilities in particular. Foremost is the status of the Borovo complex, much of which is beyond repair. Has the complex been officially written off by the national government? International donors are unwilling to take it on as a project.

Does it make sense to reconstruct the "company housing" near the ruined complex if returning Croats will have no jobs there? Will they move back there and commute to jobs somewhere else? Will the new industrial park be successful, and create a substantial number of replacement jobs? What is the reality of port reconstruction? Will it make a significant economic difference?

Local government officials and donors must have clear indications of how these issues are being solved by the Zagreb government and/or the transitional government if reliable and realistic plans are to be put into effect for utilities and services that are properly sized and staffed. If there is an official document which spells out the assumptions about the makeup, distribution, and ultimate size of the population in Sector East, it did not appear during the first field trip, and needs to be circulated and understood by all, timing to be determined by USAID.

■ **Is Osijek a resource for partnering, sharing of services and staff, and for providing non-governmental resources such as engineering, computer assistance, and best practice?** Institutional, financial, and party in power factors should be assessed, and if Osijek is deemed to be a net exporter of useful services and talents, it would be an oversight to leave it out of Vukovar's and the villages' strategic plans for becoming transparent, effective, progressive municipalities and breeding grounds for national leaders. On the other hand, if Osijek is deemed to be a political problem, or overbearing in its attitude toward its lesser neighbors, or capable of providing all services at the expense of local capacity building, Strategic Objective No. 3 will be better achieved without Osijek's significant participation with Vukovar and environs.

Future leaders and administrators will be better off in prominent positions learning firsthand how to solve management and utilities problems, as opposed to being cogs in a regional wheel, or subservient to a large city which doles out services and can create problems for the lesser entities. If Vukovar and other smaller municipalities in Sector East are to be examples of self-help and capacity building from within, they cannot be satellites of the big regional center. Inclusion of Osijek in the process might be accomplished through seats on an advisory panel, or through short term loans of executives for carefully specified assignments, or through other methods with a low potential for co-option of local powers.

Projects, Costs, and Logistics

Concept papers and engineering reports for the projects which have been tentatively identified and costed for discussions with donors are provided as annexes to this trip report. The projects presented are those which both sides agree must be done, are relatively easy to do in terms of timing and simplicity, and which fit into categories of possible assistance previously identified by the UN.

The engineering reports (prepared by Dohrman) fine-tune costs identified in the Edmond field trip, reassigns some of the priorities, and reflects the discovery of some very good local and Belgrade engineering talent in the water and electricity areas. Dohrman's major finding is that the aeration system for water needs to be considered in various ways, with the high pressure spray technique being effective but so energy intensive that it might be too expensive should electricity become a commodity whose price is based on production costs and supply and demand. Other systems for taking iron out of the water should be considered, and only after more careful analysis of iron levels and the possible methods for bringing it down to acceptable levels.

Another of his findings is that the testing and reconstruction of the main water conduit should be expanded to take into account the reconnection of secondary mains, and that the entire system needs to be checked for leaks as the conduit is examined.

Thirdly, the need for dump trucks to remove rubble may be four in number rather than ten. The requested sweeper vehicle should receive a low priority ranking, and the backup trash compactor should be at the top of the vehicle needs list.

With the possible exception of the aeration project's potential drastic reduction in design and cost, all the projects initially identified by Edmond have been kept in the same magnitude of funding range by Dohrman, and, where possible, broken into segments or phases for further discussion with donors.

Capacity Building in Vukovar and Other Municipalities in Sector East

A major immediate task is to set up a system to manage the infrastructure construction and acquisition projects, including planning for the security of vehicles (if any) and equipment during the transition period. Questions of temporary custody and ultimate ownership of utilities and vehicles must be worked out at the beginning.

Bringing various interests together and reaching consensus on project design and management stands the best chance of success if discussions limit themselves as much as possible to technical matters, and that will be accomplished as areas of potential conflict are reduced by USAID and its contractors. For example, the selection of "neutral" engineering assistance from the quasi-private sector, if done well, can move projects along without ethnic bickering. If done not so well, then the choice of engineering assistance will be the main issue rather than the projects.

This assumes that: (1) members of the existing local government will still be a major presence when projects are carried out; and (2) members of the government in exile will indeed occupy positions of power when the new government is installed. If nearly every concern can be reduced to the technical level, then with the input of neutral engineering firms, projects can be initiated with the existing local government supplying logistical help and with the government in exile participating from afar in a consultative role. For example, if the main conduit is to be fixed and the existing secondary mains are to be examined and perhaps replaced, the major area of controversy will be which mains to replace. That decision is non-technical, and therefore ethnic, because of the neighborhoods affected.

The wrangling over the neighborhood hookups could take place as a sideshow, while the major project proceeds. There would be no face-to-face contact between the government in situ and the government in exile, but rather a shuttle arrangement. The need for a multi-interest working committee may be unavoidable, and it could include members of the government in transition from Osijek, donors, the UN, USAID, and perhaps the deputy administrator for housing and public works from the county. The deputy administrator is a Croat Croatian, and could bridge the gap for the existing local government. The major question remains as to whether the current local council should be represented on a working committee, or whether a new council will be elected and in place anytime soon.

The scenario above is more thinking out loud than a plan, with much consideration needed to set up a working group that solves the logistical, security, and "non-neutral" design issues while the bulk of the non-controversial infrastructure work proceeds in parallel.

Whatever the outcome of elections and the reconciliation efforts, there will be massive turnover at the local government level, both in the council and in the administrative branch. This raises the question of what sorts of training and technical assistance efforts should be carried out, and how consistency over time is to be accomplished as administrators come and go. One possibility is to have the county government as the repository of training materials, and an active participant in training and technical assistance needs analysis for Vukovar and the other municipalities. Another possibility is to have the Osijek government as a resource and repository if deemed to be non-threatening to the process of local self-government for the other municipalities.

Another alternative is to have a resident advisor who spends one third to one half time on capacity-building, using county and other resources to best advantage as he/she sees fit. More on this topic appears below.

The prime consideration in capacity building is a solid reading on what practices are currently being carried out, and which are not, in the areas of capital investment planning, finance, and infrastructure management and operations. Studies similar to the ones done by RTI in other regions and of the national/county/local government fiscal and legal interrelationships need to be carried out for Sector East, independently or as part of the short and mid term efforts to plan and execute infrastructure projects and to staff and self-fund them for the long term. Potentials for privatization, cost recovery, and best management practice will have to be determined early on and agreed to by whatever entity is "in charge", presumably an inexperienced new local council and an administration that hopefully is chosen for technical excellence and not purely political reasons.

Resident Advisor in Sector East and Relationship with the Regular Public Administration Program for Croatia

It is too soon to say if a full-time person can be justified on purely programmatic or technical grounds, but a resident advisor would have benefits in terms of USAID's leadership in Sector East and by providing a continuing presence there as the reconciliation takes place. It may also make sense to have someone there full time on financial grounds, a resident possibly being cheaper than a succession of short term consultants.

Below is a brief description of possible roles that may add up to a resident position:

- Coordinate village grants program. Oversight and monitoring, setting of criteria for awards, and financial control on behalf of the implementing entity.
- “Magnet" and conduit for West European and other donors. A continuous presence is justified here as USAID becomes the major coordinator of aid efforts that has a daily relationship with the local officials (being careful to dovetail and not compete with the UN there).
- Coordinate short term consultants and provide logistical support.
- Identify and help groom local government high achievers for regional or national leadership positions.
- Training and technical assistance analysis, coordination, and repository of materials (and computer assistance for local budgeting?)
- *De facto* regional planner for local governments, including partnering arrangements, contracting advice, regional utility cost recovery, and other programs.
- Resident municipal finance and management expert and grantsman for municipalities.
- Conduit for best practice and informal counterbalance to national power structure. Coordinate with long term advisors in other regions for training, executive swaps, establishment of a municipal association (non-partisan), citizen participation, legal issues, press, and so on.

ANNEX A.1

CONCEPT PAPER
WATER SUPPLY IMPROVEMENTS

Introduction

The United Nations Transitional Administration for Eastern Slavonia (UNTAES) and governments supporting the Erdut Basic Agreement have a joint interest in continuation of reliable municipal services in the municipality of Vukovar during the transition period. Leaks have been the cause of great amounts of water loss, at times as high as 38 percent of the potable water available to the city of Vukovar. In addition, maintenance of the system during and since the war has been inadequate and a major Iron problem has developed. Closely targeted assistance to repair this important leak and make other repairs and improvements would provide numerous short term jobs to local residents while preparing the municipality for the arrival of returning displaced residents. The assistance would finance elements of the planning and rehabilitation of the municipal water supply where significant losses and other problems are occurring.

Regular, reliable water supply is a prerequisite for the return of 15,000 to 20,000 displaced persons to Vukovar and for the reactivation of its economy. Its principal short term importance will be for residential uses as the population returns. Demand for industrial water at present is mainly for cooling purposes at the minimally functioning Borovo plant, whose reactivation is not imminent. The three proposed activities address the short term needs of reconstruction. The longer term capital investment needs of the water system are well beyond the financial scope of the activities and require consultation with the long term plan for growth of the city.

The water system is a politically and ethnically neutral public service which is fundamental to the peaceful reintegration of the area. The water system serves all the people in the provision of domestic water, and also serves as fire fighting supply for all residents and commercial and industrial concerns, in that the municipal hydrant system is designed under standards established to provide hydrants within feasible distances from all major structures. the essentials of firefighting include adequate storage, pressure, and flow. By significantly reducing leaks and constrictions in the water distribution system, two of those three criteria will be improved.

The governments in Zagreb and Belgrade have already agreed to normalization of electrical supply and telephone networks. The water company is traditionally a municipal entity, operated within national guidelines by the local government. An agreement on the important repairs to the drinking water supply system would solidify the resolve of local Serbs to remain in their homes, while ensuring that returning displaced Croats have the city services necessary to rebuild their homes.

The proposed activities will not in themselves ensure a reserve capacity for fire protection, but in combination with other improvements will do so in the mid term. Fifty thousand residents of Vukovar municipality will need to be protected by a standpipe reservoir or by an arrangement that depends on pressure buildup through pumps.

Assistance Packages

After the reintegration, the municipality will be expected immediately to meet its domestic water needs, at its full postwar population, through the use of five functioning wells and a distribution system which is relatively free of

leaks (less than 5 percent losses), and defects such as constrictions and faulty hardware. The municipality today suffers from a lack of reliable information about its pumping output, the exact locations and severity of leaks, (apart from the major one of the Borovo complex) and the condition of individual segments of mains and the conduit.

Curing these problems will put the municipal water system back to its prewar status as a well-run utility which controls its operations and maintenance through constant monitoring of conditions, and through other preventive maintenance measures.

A review of existing cost estimates for all anticipated equipment purchases, distribution system improvements, and major capital investments (such as an aeration system for pumped water), needs to be carried out and refined. This will serve as a basis for donor participation and will provide for the introduction of best practice as to design and materials for major improvements and equipment.

There are several sets of activities in the improvement program, most of them minor in level of effort but crucial to the water supply program.

- **Activity 1: Rehabilitation of the Conduit and Associated Mains.** Approximately eight kilometers of the main water conduit will be inspected for leaks and general condition. Leaking segments and worn out hardware will be replaced. In areas where smaller mains had been disconnected, judgments will be made about reconnection, and some smaller mains will be restored.

The extent of damage to the main conduit and water mains needs to be carried out to determine the locations and extent of leaks caused by cracks in the pipes and joints, the latter attributed to vibration from artillery shell explosions. This will be accomplished with the use of new testing and measuring equipment by trained staff.

The first operational component will be the complete inspection of the major conduit and water mains for leaks caused by cracks in the pipes and in the joints, the latter being attributed to vibration from artillery shell explosions. This will require the purchase of measuring, testing, and leak detection equipment and the training of water utility staff.

When the project is bid, the major leaks in the system itself will be repaired, and those sections of pipe which have been disconnected will be replaced. Major valves, meters, shutoffs, and other hardware will be replaced. Flow meters and other maintenance and analysis instruments will be installed as needed.

This activity has been proposed to UNTAES. Both Croat and Serb authorities are agreeable as to its implementation.

- **Activity 2: Inspection, Cleaning, and Repair of Wells.** Vukovar draws much of its water from an aquifer under the city. Seven wells will be tested for efficiency, and cleaned where necessary to remove foreign materials. Pump condition will be determined for each, as well as filters and other components. Pumps, filter systems, and other components will be replaced as necessary. Flow meters and level meters will be installed. Investigation of the future sufficiency of the aquifer will be carried out at this time.

The inspection and repair of the seven wells and associated equipment will be a major component whose costs depend on the condition of equipment which had not been adequately maintained since the war. Two well pumps may have been shut down prior to the war, some siltation has occurred in at least one well, and a filter system in at least one well is in disrepair. Moreover, the methods and materials currently used to filter well water must be analyzed for appropriateness. Croatian technicians believe that five to seven functional wells will deliver enough

potable water to the municipality for many years, and that the aquifer will at best support two additional wells for expansion to meet future demand. These assumptions must be verified during the design of the aeration system and other works.

In addition to repairing the wells, an analysis of water system master plans, is needed. Its major considerations will be:

- Creation of reserve water capacity and maintenance of pressure and flow whether through new standpipes or some other means;
- Methods to be considered for supplying industries with partially treated river water ;
- Whether to continue river water usage for domestic supply;
- Feasibility of using the existing well field aquifer for additional wells ;
- Projected need for additional wells; and
- Increases to demand anticipated from all sources.

Analyzing available data on these issues will enable decisions to be made about the nature and extent of short term and mid term repairs and improvements to the system.

Croat and Serb acquiescence to this activity has been obtained.

■ **Activity 3: Construction of Aeration Facilities.** Iron in the drinking water causes long-term health concerns, as well as early deterioration of the water supply system. The iron content can be greatly reduced by the use of an inexpensive, proven aeration technology—essentially by spraying the water into the air as a fountain and adding specific chemicals during purification. The installation of an aeration facility would significantly improve the quality of water delivered to Vukovar citizens.

Siting of the facility at the well field area will be determined, with an initial capacity to aerate water from seven wells and accommodate an additional two. A calculation will be made as to the average number of wells to be served, with some to be held in reserve status at any given time. Best practice will be applied to minimize equipment usage time and use of chemical agents, both for aeration and other treatment processes. Also, a determination would be made as to disconnecting river water from the domestic system or to continue mixing water sources as necessary to recharge the aquifer and meet seasonal demands.

The most significant component under this activity will be the construction of an aeration system for well water which will reduce Iron content to an acceptable level. Iron currently is clogging critical pipes and is causing algae to grow in system components. Facility size and design will be based on the maintenance and repair of the five to seven wells now available. Aeration will be a new activity for the water enterprise, requiring training for staff and the maintenance of new facilities.

Croat and Serb acquiescence for construction of an aeration facility has been obtained.

Next Steps in the Project Development Process

For each activity the repairs and their costs must be estimated in more detail. West European and American technicians would work with local personnel to develop the estimates and schedule for the repairs. The survey would require approximately one week and could be conducted as early as June 1996. Its products would be:

- An examination and analysis of all existing documents regarding costs of components and equipment, labor, engineering design, and project supervision. Judgments about the technical feasibility of all envisioned repairs and improvements, their compatibility with official master plans for the water system, and best practices and materials to be incorporated into the project.

- A sequence of work and a cost estimate for the repairs to the water line and its ultimate separation from the industrial water source.

- An outline of the structure and functions of the water supply company, to be authorized by UNTAES. (UNTAES has this authority under Article II of the Erdut Agreement, elaborated in point 17 of the Secretary General's report to the Security Council, dated December 12, 1995.)

The detailed technical design would be jointly undertaken by a team of local and international experts. They would refine the work previously done, and produce a contractible set of specifications and other necessary bid documents so that a tender could be issued by UNTAES as soon as the appropriate administrative framework is in place. At this point, the sources of finance for the various elements of the rehabilitation would also be identified. Concurrent with the physical rehabilitation work, staff training as necessary would take place.

Parallel to the repair of the major leaks in the Vukovar municipal water lines, UNTAES and the other donors would undertake a dialogue with the Croatian Government to consolidate the legal situation of Vukovar municipal water company in the post-UNTAES period.

ANNEX A.2

CONCEPT PAPER
MUNICIPAL VEHICLES

Introduction

The UNTAES and the international community are seeking the means to promote a smooth and peaceful reintegration of the region under United Nations administration. The implementation of high profile, quick disbursing projects which would generate visible change in the city as well as providing short term employment. However, there is little experience in the operation of assistance projects in the UN region, resulting in the need to encounter simple, transparent activities where implementation procedures can be tested. One such activity is the demolition of unsafe remnants public structures and removal of the rubble, setting aside those buildings of historic significance. UNTAES has a project to hire personnel under a public works activity to handle the demolition. The major constraint to the removal of the rubble is the availability of dump truck to haul the rubble from the site to an approved dumping ground. A fleet of ten 6-ton trucks with hydraulic tipper bed is sufficient to carry out the task.

A second area of concern is the sanitary condition of the municipality. The main issues that ought to be addressed are:

- Informal dumping of household trash in dumps intended only for rubble, and along the roadsides and riverbanks;
- Lack of street sweeping other than in the downtown area; and
- Inability of the municipal government to pump out cesspools and dispose of septage properly—no private companies are available to provide this service.

The municipality previously had an adequate fleet of vehicles, most of which are either broken down with overuse or are missing. Some efforts have been made to contract for some services, such as winter maintenance, with a Yugoslavian company, but many functions remain undone or are performed inadequately on an informal basis. For example, cesspool pumping is presently done by farmers on tractors with small tanks. Several trips are required to empty a cesspool, and the septage is spread on farm fields or in places unknown to municipal health officials. Having municipal control of this service once again will ensure efficiency and the certainty of proper disposal at a municipal facility.

Solid waste reportedly is being picked up on schedule, but the possibility of the one remaining Russian-made compactor truck breaking down causes concern about health maintenance. Despite reports of timely trash and garbage pickups, food waste and household trash are being dumped informally, raising concerns about rat population explosions and the leaching of liquids into the rivers and aquifers. (The city wells for drinking water are in the aquifer immediately below the city.)

Street sweeping activities have been curtailed to include only the downtown area, and is done with push brooms currently. A new sweeping truck will cover all of the city as needed, and will form the main effort in sweeping streets around rubble clearance areas. The Croatian side believes that funding from the national government will bring 3,505 housing starts and reconstructions by mid-1997, creating a problem of street debris and mud that crews with push brooms will be unable to manage. Safety and convenience will be enhanced as the sweeper picks up mud, sharp metal fragments, and general rubble. Skidding accidents will decrease and citizens will have safer walkways and road shoulders. Public morale will be raised.

The project contributes to the immediate UNTAES goal of demolishing the remains of public and private buildings, an activity which will provide upwards of 1,000 short term jobs, even through the winter. It sets the stage for the reconstruction of residences and public structures as the transition matures.

The urban population of the Vukovar municipality, estimated at 15,000 persons in May 1996 and 30,000 persons in October 1997, will be direct beneficiaries of the increased safety which these demolition and other public works measures produce. Children especially will be at a lesser risk, as both unsafe conditions and havens for rats are eliminated. The activity will provide 14 skilled and 24 unskilled jobs during a six month period.

Three constraints to implementation must be considered: illicit exportation of the vehicles (both activities), recurrent costs of operation (both activities), and coordination with the building demolition program (dump trucks).

Initial discussions with UNTAES reconstruction staff indicate that the UNTAES might be willing to place its own license plates on the new vehicles and keep them in a UNTAES motor pool.

As all rolling stock is subject to being removed from the municipality, strict controls over the vehicles will be necessary. Possible measures are: daily sign-in and sign-out routines, inspections in the presence of drivers and supervisors, warning of criminal sanctions against offenders, and perhaps most effectively, electronic locating devices such as Lo-Jac installed covertly and sealed against tampering.

The matter of recurrent costs depends upon the agency which is the owner of the vehicles. The City of Vukovar, Serb side, has little of its own funds to spend on the project. The Croat side has not offered to put up funds, as they are not in control yet. The UNTAES demolition project has yet not been sufficiently defined for cost elements to be available.

Coordination with the demolition program is important, as the Croatian side has already expressed concern about the demolition of ruined private dwellings without the owner of the property having seen it first. This was also a problem in demolition activities in Mostar. UNTAES proposes to start with ruined public buildings (those of historic interest being preserved), but it has not set a date, nor has explicit Croatian approval been attained.

Assistance Package

- **Activity 1: Multipurpose Utility Trucks.** The implementing agency will be the local government road company. Reportedly there is local capacity to perform the minor maintenance activates associate with such vehicles, with shops and contracting mechanics available, at a cost, nearby. This program will include a starter kit of spare filters, tires, windshield wipers, etc. to cut recurrent costs in a period of high demand on repair shops. Qualified drivers are present, now performing unskilled work. Those who remain in the city can be promoted back into driving duties and their old laborer jobs filled with unskilled citizens.

Ten vehicles will provide an active fleet of approximately eight at any time, with an average of two down for maintenance or used on other critical municipal activates. In addition, an early phase of the engineering analysis will determine whether the trucks being purchased should be specified for winter maintenance, which includes light plowing, sanding, and salting. Two or three trucks could be fitted for snow plows and sanding/salting equipment, and those accessories purchased as part of this or a subsequent program.

- **Activity 2: Other Maintenance Vehicles.** The communal services department of the municipality will make use of new vehicles for specialized activities in the area of public health and sanitation. These vehicles will

replace those lost or disabled and will restore services to prewar levels in critical aspects of the reconstruction program. Threats to public health will be reduced, and morale will be increased as these relatively inexpensive equipment items are put into use

Those other vehicles are as follows:

- *One compactor truck.* Such a vehicle will be used to pick up trash in containers and plastic bags, and will enable pickup twice per week while the rat population is high. At either 9, 15, or 18 cubic meters in capacity, this vehicle will serve as the main solid waste collection truck in a fleet of three, each specialized to take care of particular need s for industries, apartment blocks, and individual houses.

- *Two cesspool pumping trucks.* These are being priced at both the 6 cubic meter and the 12 cubic meter size. Cesspools typically are 1.5 to 2 cubic meters in volume, and Therefore truck size will have a bearing on efficiency and fee income. Approximately 1,000 homes in the communal services department's jurisdiction will be serviced. This service could bee provided by a private concession rather than the municipality, but such a decision is beyond the scope of the initial project.

- *One street sweeper vehicle.* This will replace one of the two missing prewar vehicles. At 5.5 cubic meters in capacity, this vehicle will brush up dirt, mud, and debris from all streets on a scheduled basis, and as demolition and rubble removal activates increase it will be used to clean up streets adjacent to such sites. Reportedly Vukovar in prewar days contracted out this service to other municipalities, and consideration will be given to such an arrangement in the far future, noting that one vehicle, and not two, will be present in Vukovar.

Additional items such as shovels and other hand tools will be purchased for the crews doing small projects and putting the debris onto trucks and moving it about on site and at debris dumps. The intent is to mechanize the major part of the removal activities, but to use hand labor where possible to maximize unskilled job creation. At present insufficient end loaders and bulldozers exist to mechanize the jobs.

The implementation sequence for the above activities is as follows:

- Procurement of vehicles, importation, and storage for delivery.

- Coordination with the UN demolition program.

- Set up a maintenance schedule and other administrative programs to keep the trucks in service and used to best advantage for the tasks identified and assigned.

Recurrent costs include fuel, minor maintenance and replacement parts, and the necessary contracting out of major maintenance jobs. Minimization of hydraulics and other complex systems will cut down on major repair costs and down time.

Next Steps in Project Development

The next steps in project development are as follows:

- Obtain explicit acceptance of the activity by UNTAES, Croat and Serb authorities. The selection of buildings to be razed will be sensitive.

- Identify the specifications of the vehicles. Include projected frequency and types of pickups, haul distances to current and projected dumping sites (compactor), haul routes and concentrations of cesspools (pumping trucks), and projected demolition activities as related to hauling routes to planned debris dumps.

- Size vehicles and cost likely accessories. Specify best practice and compatibility with local winter maintenance activities (dump trucks). Cost any additional safety and security measures for retention of vehicles over time. Determine licensing and ownership procedures.

- Arrange licensing and security for vehicles.

- Analyze existing quotes for price and verify availability of vehicles (several options).

ANNEX A.1

CONCEPT PAPER
RESIDENTIAL ELECTRICAL SERVICE

Introduction

The UNTAES and the international community are seeking the means to promote a smooth and peaceful reintegration of the region under United Nations administration. The implementation of high profile, quick disbursing projects which would generate visible change in the city as well as providing short term employment. However, there is little experience in the operation of assistance projects in the UN region, resulting in the need to encounter simple, transparent activities where implementation procedures can be tested. One such activity is the repair of the stabilizing equipment in key electrical transforming stations. These stabilizers prevent power surges which damage motors and electronic appliances. Additionally, faulty transformers have been causing brownouts in certain weather conditions. and a general unreliability in the electrical distribution system. Approximately 500 residential area transformer stations exist, but not all are damaged. Although the number of these stabilizers to be installed is constrained only by the funds available for the work, the initial activity will be limited to the most important transforming stations.

Reliable electrical service is a prerequisite to economic reactivation and to the rebuilding of Vukovar. The current system cannot handle the reduced number of motors and eclectic heaters which now are in use, let alone cope with the demand by electric equipment put in place for the reconstruction. In most parts of the city, the best short term solution to winter heating (in the absence of district heating plants) is electricity.

As the economy begins to reactivate, the quantity of additional jobs will be dependent, in part, upon the availability of electricity.

Economic Justification

Approximately 4,000 persons (1,000 families) will directly benefit from the first installation of stabilizers at four transforming stations. Indirect beneficiaries will include employees of small businesses located in the improved areas, through the proper voltage being supplied to industrial and commercial equipment. The activity will provide four skilled and ten unskilled jobs during a two month period.

A possible constraint is the probable need to donate funds to the power company for installation and inspection of the final product under standards set by that authority. It is currently unclear as to the power authority's legal ability to have work done on its system by others.

Assistance Package

The project will procure and deliver the necessary hardware to replace electrical transformers in residential neighborhoods where reconstruction is likely to take place quickly. As noted above, the legal implementing agency for electrical repairs is the power monopoly. Croat sources indicate that the state agency has plans and costs, but may not have funding for this project. Approval to have the work done by local power staff or contractors must be secured. Acquisition of electrical hardware and associated equipment, which is primarily step-down transformers, stabilizers, and connections, is to be carried out under best practice, using local equipment which meets current environmental standards.

Costs and staff for installation will be estimated by an engineer, based on the particular transformer stations to be repaired, and the project will be carried out to repair stations in rank order of importance to households served and commercial and industrial facilities to be assisted, as far as the donation(s) will carry it. Preliminary costing is being carried out on the Serb side at the municipal level, with complete information to be available in early June. Nine top priority industrial step-down transformer stations also exist, but are considered as a later phase of the project, or for GOC investment, due to cost of these stations and the longer term reactivation they would support. Labor will be provided by the power company as a contribution to the activity.

This project lends itself to short-term solutions, with no site preparation or other construction activities necessary. Analysis of the problem that has been done locally needs to be verified by power monopoly engineers. Then a rank ordering of the equipment replacements can be made. The implementation sequence will be very straightforward once approvals have been gained. Installation of equipment entails little disruption of service, with most transformer stations taking a day or less to repair. Croat and Serb acquiescence to the plan has been obtained.

Next Steps in Project Development

The next steps in project development are as follows:

- It will be necessary to make certain that this project is consistent with master plans for reconstruction, and that the work can be done by local tradesmen or contracted out.

- It will then require the explicit acceptance of the activity by UNTAES, Croat and Serb authorities. The selection of neighborhoods to benefit will be sensitive which may necessitate the mixing of residential and commercial beneficiaries for the program.

- Specifications of the equipment, neighborhoods to benefit, costs of each station repair, and industrial/commercial beneficiaries, will be produced by local officials early in June.

- American and West European engineers will verify and refine plans and specifications drawn up by local engineers and verified by the power monopoly. Best practice and materials will be ensured.

- The project work may commence on July 1, 1996 or upon arrival of the electrical components.

ANNEX A.1

CONCEPT PAPER
TRAFFIC SIGNALS AND SIGNAGE

Introduction

The UNTAES and the international community are seeking the means to promote a smooth and peaceful reintegration of the region under United Nations administration. The implementation of high profile, quick disbursing projects will generate visible change in the city as well as providing short term employment. However, there is little experience in the operation of assistance projects in the UN region, resulting in the need to encounter simple, transparent activities where implementation procedures can be tested. One such activity is the replacement of traffic signals and signage which was destroyed in the 1991 war. Approximately ten intersections were controlled by electric signals before the war that need major repairs. Signage would be replaced using international standard symbols.

Local records indicate a very high level of danger to pedestrians and drivers alike in the area, with the following data available for 1995:

- 26 traffic deaths;
- 86 serious injuries, 122 minor injuries;
- 495 reported traffic accidents; and
- 328 vehicles damaged, with a cost in excess of DM1 million.

A major cause of this carnage is the lack of intersection lights and traffic markings and the absence of warning signs near intersections and dangerous conditions. Drivers and pedestrians have gotten out of the habit of using caution, and need to have a stable traffic control system to begin to regain their previous level of prudence, order, and restraint.

The opening of Vukovar and the increasing activity related to reconstruction will generate greatly increased vehicular traffic. The city in its present condition already has a vehicle accident rate five times greater than commonly accepted norms. A significant degree of traffic safety can be restored by the replacement of electric traffic lights and passive markings. Short term job creation is not significant, although the lights, signs, and pavement markings will be immediate signs of change.

The urban population of the Vukovar municipality, estimated at 15,000 persons in May 1996 and 30,000 persons in October 1997, will be direct beneficiaries of the increased safety which these traffic control measures produce. The activity will provide four skilled and twenty unskilled jobs during a four month period.

A constraint to implementation is the potential for electrical service having been destroyed for the traffic control lights and pedestrian crossing lights. On-site verifications with proper testing equipment must be performed.

Assistance Package

The implementing agency will be the local roads company, which will work in accordance with a master traffic and pedestrian plan being drawn up by a regional committee. That committee will recommend the creation of certain pedestrian zones near the city center, and will recommend which traffic intersections to eliminate or downgrade. new

signage, painted pedestrian crossings, dividers, and coordinated traffic signals will be installed in accordance with modern safety standards, and with internationally-accepted symbols on signs and roadways.

Traffic signals and controls must be replaced and repaired as necessary (no lights were observed to be operational). This includes approximately 8 traffic signal configurations, 16 pedestrian signals, and 30 control boxes and associated hardware. Passive signage consists of approximately 200 assorted signs, primarily "stop", "yield", "pedestrian crossing", "intersection ahead", and directional. Project signage will be in internationally accepted symbols wherever possible. Emphasis will be placed upon improving pedestrian crossings and blocking areas where J-walking has been observed as a hazard. The use of curbing, bollards, and other separation devices will be given special attention.

Next Steps in Project Development

The next steps in project development are as follows:

- Obtain explicit acceptance of the activity by UNTAES, Croat and Serb authorities.
- Identify the intersections to be controlled by lights, and estimate the technical requirements for replacing the signals and control boxes. Estimate the number and kind of signage as well as the supports and attachments required.
- Agree with Vukovar officials to hire staff and install lights and signs. Paint crosswalks and install pedestrian safety devices.

ANNEX B.1

ENGINEERING REPORT
WATER SYSTEM IMPROVEMENTS

System Description

The current Vukovar water system suffers from several deficiencies due to age, design, deferred maintenance and the effects of the war. These deficiencies constitute significant health and safety issues facing the City as it begins reconstruction activities. Borderline water quality and limited fire protection may inhibit reconstruction if not corrected in the near future. Before we can define short term projects and long term system objectives, it is prudent to review the current system, highlight its strengths and weaknesses so that we can establish an appropriate framework from which to establish goals for the future.

Supply

Water supply comes from a combination of subsurface wells, augmented by the original river withdrawal and treatment system. According to water company staff, current water supply is estimated at 300 to 350 liters per second (l/s) (4,750 to 5,550 gallons per minute (gpm)), 50 percent from river water and 50 percent from wells. This relatively high usage, given the reduced population, is the result of many system leaks. Leakage just after the war was estimated at 60-70 percent. Five years of analysis and repair has reduced the leakage percentage to an estimated 38 percent.

Prior to 1985, Vukovar relied solely on river water for its needs. River water was treated by a conventional coagulation, sedimentation and sand filtration system followed by chlorination. In 1985, seven new 600 mm (24 inch) diameter gravel packed wells were installed to increase capacity and improve quality. These wells, located 6.5 kilometers (4 miles) outside of Vukovar, are connected to the original treatment works near the industrial complex of Borovo by a 600 mm diameter pipeline. Unfortunately, the well water suffers from high iron and manganese levels and must also be treated before distribution.

Of the seven wells, only five are currently operating at a reduced capacity. Each well pump is rated at 55 l/s (872 gpm) but are estimated to be pumping only 30 to 40 l/s (475 to 635 gpm). There are no operating flow metering devices on the wells. Three of the five operating wells pump varying amounts of fine sand and one of the discontinued wells is totally blocked with sand. The sand indicates either a design problem with the original installation of the wells, or deterioration of the well screens. Water works officials indicated that the well screens are standard steel which is subject to corrosion, depending on water chemistry. Standard U.S. technology calls for well screens to be made of stainless steel which is resistant to corrosion.

Treatment

The river and well water are combined for treatment in a conventional filtration system. Chemicals are added in a mixing tank to coagulate suspended material in the river water and oxidation of the iron and manganese in the well water. After sedimentation, sand filtration and chlorination, the water is pumped to the distribution system. During the summer months, activated charcoal is added to the sand filter to control odors. Iron levels in the well water vary from 1.60 to 2.6 milligrams per liter (mg/l) before treatment. Water department officials stated that there are no other water quality issues, with all other parameters within acceptable ranges.

The filtration system was originally designed only for river water. Its use for both river water and well water is inherently inefficient and water quality is compromised.

Distribution and Storage

Water is distributed to the City users through a network of pipes ranging in size from 125 mm (5 inch) to 600 mm diameter. System pressure is provided by three system pumps, rated at 140 l/s (2,220 gpm) each. Two pumps normally operate full time with the third as standby.

The original system included a 2,200 liter (600,000 gallon) storage tank. Based on data provided by the water department, this tank was designed too small and other operational/design factors prevented its full utilization. One problem with the existing tank is that it is located in a higher elevation area of the city and high pressures must be generated in the lower areas of the city to fill the tank. These higher pressures have contributed to the past and present leakage problems. The tank was destroyed during the war and has been removed from the system.

Even before the war, the system suffered from distribution leakage, especially in the older portions of the city. These older cast iron and galvanized pipelines have deteriorated over the years, primarily from external corrosion from ground water. The war, with its heavy shelling, compounded the leakage situation. Some of the worst areas have been replaced with PVC pipe but other areas still need replacing.

The main feature of the distribution system is the primary conduit which extends from the treatment facility in the northwest of the city, near the Borovo industrial complex, to the former storage tank in the southeast sector of the city. This 8 kilometer long conduit is primarily 400 mm (16 inch) and 450 mm (18 inch) diameter, ductile iron pipe and was installed in 1960. Although the pipe itself should have withstood the vibrations and shockwaves from the shelling, some joints and valves are suspected of being damaged.

Industrial Usage

The Borovo industrial complex is, by far, the city's largest water user, primarily for cooling water. Although metered records are not available, it is estimated by water department staff that the Borovo complex used over 50 percent of the water supplied to the city before the war. Since the complex was severely damaged during the war, actual industrial usage today is dramatically reduced.

Previous Studies

In 1994, "Ehting", (EHT) a private engineering company from Belgrade, performed an extensive evaluation of the entire Vukovar water system. One of the major aspects of the EHT study was an extensive review of the distribution system including a computer simulation. Temporary flow and pressure monitors were placed along the main conduit and within other distribution areas, in order to locate problem areas. A computer network analysis was prepared which simulates flow and pressure conditions. The analysis identified areas of high leakage and pressure problems.

A portion of the computer simulation is shown on Figures B.1 and B.2. Figure B.1 shows the distribution system in the northwest portion of the city near the Borovo complex while Figure B.2 shows the commercial center and remainder of the City. One significant outcome of the computer simulation was the identification of a very large leak or leaks within the Borovo complex. A brief review of the EHT study, through discussions with EHT staff, indicates that the study was well done and its results and conclusions valid. Since the written report is in native Yugoslavian language, a more thorough review was not performed.

The EHT report recommended a comprehensive rehabilitation program consisting of both short term emergency repairs and long term system changes. Three short term emergency projects were identified by the EHT study as follows:

- *Repairs to Main Conduit.* Although the EHT study concluded that the majority of the remaining leaks were in the smaller diameter secondary branch zones of the distribution system, these areas cannot be properly analyzed or isolated until repairs are made to the main conduit, including:

  — Location and repair/replacement of all main line valves;
  — Location and repair of all fire valves and pits;
  — Sonic leak detection of the entire conduit plus repairs. Leak detection equipment to remain with the water company;
  — Location and disconnection of all branch connections, known to be sources of significant leakage.; and
  — Construction of permanent pressure and flow monitoring stations.

  The above repairs to the main conduit were estimated by EHT to cost approximately $174,000 in following categories:

Materials	$53,000
Labor	85,000
Supplies	36,000
Total	$174,000

  It is estimated that this project will employ up to 45 workers and take 90 days to complete.

- *Inspection, Cleaning and Repair of Wells.* As stated above, the wells are in poor condition and in need of inspection and repair as follows:

  — Remove pump and inspect well screens using closed circuit TV camera;
  — Re-design and replace well screens and gravel packs as required based on TV inspection results;
  — Re-develop wells via over-pumping and surging;
  — Chemical treatment to remove iron build-up, if required;

Figure B.1
Water Distribution System—Northwest Vukovar and Borovo Complex

Figure B.2
Water Distribution System—Central Vukovar

— Install new water level measuring devices; and
— Install new pressure and flow monitors.

Since the cost of repairs will depend on actual conditions encountered during the well inspection and redevelopment, the actual costs are difficult to estimate. The following estimate is based on limited data and assumptions regarding conditions to be encountered.

Remove and reinstall pumps & motors, with TV inspection	
7 wells @ $6,000 each	$42,000
Re-design and repair wells, replace well screens	
assume 5 wells at $25,000 each	125,000
Re-develop all wells.	
7 wells @ $8,000 each	56,000
Chemical treatment	
3 wells @ $4,000 each	12,000
New meters	
7 wells @ $5,000 each	35,000
Subtotal	$270,000
Contingencies @ 15%	27,000
Total Estimate	$297,000

It is estimated that this project will employ 15 workers for a period of 40 days.

- *Construction of Aeration Facilities.* Along with several other broader based system changes, the EHT report recommends a change in the water treatment system for well water. The high iron and manganese in the well water must be oxidized prior to filtration. Currently, this is being accomplished by adding chemical agents to the well water. EHT has recommended that new spray aeration facilities be constructed to perform the oxidation of iron and manganese. Although this would be an effective means of oxidizing the iron and manganese, it may not be energy efficient. This method is not commonly used in the U.S. due to high electricity costs needed to increase water pressures to atomize the water into droplets sufficiently small enough to allow the oxidation to occur. Chemical oxidation or diffused air aeration are the preferred methods used in the U.S., for oxidizing iron and manganese, prior to filtration. Electricity usage in Croatia and Serbia is currently not metered and all users pay a flat rate irregardless of usage. This system promotes waste and inhibits energy conservation and most likely will change in the future to a metered user fee system.

  Rather than proceeding with EHT recommendations, a more thorough evaluation of alternatives should be performed to include chemical oxidation and/or diffused air aeration. The evaluation should include capital as well as life cycle costs, assuming that future energy will be based on actual usage rather than a flat fee.

  The cost of the evaluation of well water treatment, including pilot studies of various treatment alternatives, is estimated at $50,000.

In addition to the above short term projects, the EHT report recommends the following long term improvements.

- *Separate Supply System for Borovo.* Since Borovo uses water primarily for cooling in its manufacturing process, the EHT report recommends that they develop a separate river water intake and treatment system for manufacturing use, while continuing to use city water for drinking and other potable uses. This would dramatically reduce potable water supply and treatment demands on the city system. EHT estimates that if the Borovo cooling water were removed from the system, and system leakage were reduced to below 10 percent, then the existing 7 wells could serve the remaining domestic needs of the city, with the use of river water only as a back-up.

- *New Storage Tanks.* The current use of system pumps to provide system pressure is a very inefficient use of electricity. Although these pumps are large enough to provide sufficient fire flows, they are subject to power failures or other interruptions of electricity. It also relies on a single pipeline from the treatment facilities to supply water to the system. Current national standards recommend a storage volume equal to eight hours of average daily usage should be provided for adequate fire protection during an emergency power outage. The use of system storage should also dramatically reduce power costs for the system pumps. Using the eight hour standard, a storage volume of 8,600 m^3 is recommended as compared to the 2,270 m^3 of the current inoperable tank.

  The EHT report recommends that four separate storage tanks should be provided to increase storage and improve pressures throughout the system. Although the general areas of these tanks have been determined, their precise location and design will require further study, estimated by EHT at a cost of $20,000-$30,000.

- *High Pressure System.* As stated earlier, the southeast portion of the distribution system is approximately 30 meters above the other portions of the city. In order to provide sufficient pressures to serve this higher area, the lower areas experience excessively high pressures. EHT proposes to create a high pressure zone in the southeast portion of the city using a separate storage tank and pumping station. This would permit a lowering of system pressures in the remaining portions of the city, which would conserve energy, and reduce leakage and pipeline damage.

USAID Recommendations

The following recommendations are based on a limited review of the proposed projects and interviews with the water company and their consultants. USAID did not perform a detailed review of the proposed projects nor inspect all of the facilities involved. A more detailed review of the proposals should be performed when the donor entity has been identified. In particular, materials and equipment provided should be compatible with existing equipment.

Distribution System

Although the EHT recommendations regarding repairs to the main conduit appear correct, the proposed program does not go far enough in the actual repair or replacement of pipelines in residential areas to permit reconstruction and resettlement to proceed. The proposed program simply calls for the disconnection of secondary systems found to contain significant leakage in areas of widespread shelling and destruction of homes. Sonic leak detection is proposed only for the main conduit and not the secondary systems under the proposed program.

It is recommended that the initial main conduit program be expanded to include sonic leak detection in all secondary branches of the distribution system, regardless of their condition, including the suspected large leakage in the Borovo complex. Subject to a politically neutral review of the leak detection results, repairs and/or replacements of secondary branches would be prioritized and implemented subject to the remaining budget. As a minimum, the central commercial areas and surrounding residential areas, to be included in the electrical system upgrade and building demolition programs, should be included. Borovo should be required to repair their system or face disconnection from the city system.

The original budget estimate of $174,000 should be increased to $500,000. This will permit the location and inventory of all leaks within the system and repairs to proceed in the higher priority secondary distribution areas as well as the main conduit. It is estimated that the expanded program will increase employment from 45 to 60 workers and extend the completion time to 120 days.

Supply System

USAID agrees with the proposed rehabilitation of the existing well field. Restoration of these wells, in combination with repairs of major system leaks will improve water quality in the system, reduce reliance on river water and conserve energy.

Other Project Proposals

USAID does not agree with proceeding with the construction of the aeration facility at this time. Depending on whether other system improvements are made, other treatment alternatives may be more efficient than the proposed aeration system. This proposal requires further evaluation including a life cycle cost analysis concentrating on energy costs.

A separate cooling water system should be provided for the Borovo industrial facility.

The inclusion of adequate storage is a basic requirement of any water distribution system. The proposed construction of a new storage tank or reconstruction of the former tank and the proposed high pressure system to serve the southeast sector of the city are projects that should be supported. With the creation of the high pressure zone, the existing tank volume would be sufficient only for that pressure zone, with additional storage still required elsewhere in the system. The high pressure pumping station should also be equipped with a pressure reducing valve to permit fire flows to backflow into the low pressure system. Design and construction of the southeast tank and pumping station is estimated at $600,000. The structural condition of the existing tank has not been reviewed, and therefore a recommendation regarding reconstruction the existing tank or construction of a new tank cannot be made at this time.

Although supporting the provision of new storage facilities and a separate high pressure system for the southeast sector of the city, there is insufficient information to comment on the other proposed storage tanks or their locations. These recommendations should be based on a computer simulation of supply and distribution systems, including both fire and peak demand flows. The implementation of a separate industrial water supply for Borovo and the upgrading of the existing wells could impact these evaluations.

The issues of a revised treatment process and additional storage requirements should be combined into a supplemental study to be performed after other system improvements are made.

Summary

Recommended projects are listed below in order of priority with estimated costs:

	Workers	Duration	Cost
(1) Distribution system improvements, leak detection and repairs	60	120 days	$500,000
(2) Inspection, cleaning and repair of wells	15	15 days	$297,000
(3) Construction of separate river water system for Borovo cooling water		(Private/State Funding)	
(4) Replacement of southeast storage tank and construction of southeast pumping station	20	45 days	$600,000
(5) Alternatives evaluation for well water treatment and additional storage capacity	10	30 days	$70,000

ANNEX B.2

ENGINEERING REPORT
PUBLIC HEALTH SERVICES
SOLID WASTE MANAGEMENT/SEPTAGE PUMPING/STREET SWEEPING

Current Situation

The Department of Public Works (DPW) currently has a staff of 88 and utilizes approximately 20 vehicles, most of which are in the 15 to 20 year old range. The DPW is responsible for waste collection and disposal, sewer maintenance, street sweeping, parks and green spaces, cemeteries and septage pumping. Prior to the war, Vukovar took pride in being a very clean city and DPW staff boasted of have more equipment per population than Zagreb. During the war, equipment was damaged or destroyed and some major vehicles were taken and not returned. In the years since the war, limited resources and more pressing priorities continued to take its toll on DPW equipment. At the present time there are significant shortages of adequate equipment in three public health service areas, solid waste management, street sweeping and septage pumping.

Solid Waste Management

The current waste collection fleet includes three vehicles, two skip trucks and one rear loading compactor truck. The 2 skip trucks are 15 to 20 years old and service 5-7 m^3 skips located in commercial areas, the Borovo complex, public companies and the markets. Approximately 55 skips are located throughout the city and are serviced at least once per week. The skip trucks operate one shift per day and service an average 20 skips per 8 hour shift.

Prior to the war, the city operated four compactor trucks of various sizes. Now the city has only one remaining compactor truck, a 6-year old FAP rear loading compactor with a 15 m^3 capacity. Prior to the war, most of Vukovar received house to house collection, three times per week. This was augmented with 1.1 m^3 containers in public areas, and markets. The older narrow streets were serviced with a smaller compactor truck. Since the war, the DPW has revised collection routes to include more containers, and less house to house collection. This is due to the inability of the larger truck to access the narrower streets, lack of individual dustbins in poorer communities and a great reduction in housing densities, making house to house collection very inefficient. Approximately 100 small containers (1.1 m^3) are collected at least once per week.

Although some areas of illegal dumping were observed in outlying areas, the downtown and residential areas appeared free of waste buildup and illegal dumping which are normal signs of an inefficient collection system. The DPW has been very fortunate in that their main collection truck, the 15 m^3 compactor, has been very reliable, with a reported down time of only 10 days in 6 years. Routine maintenance is performed by DPW staff, but repairs are performed under contract with a repair contractor from Belgrade, who offers 24-hour repair service in Vukovar.

Another positive aspect of the waste collection service is that Vukovar's citizens have responded well to hard times and limited resources. Our stay was brief in Vukovar, but we did not observe any significant signs of littering.

Although the waste collection system is holding its own at the present, this will likely change in the near future, once the transition begins. Population will increase, waste will increase and the DPW will be pressured to increase its services in other areas. The current collection vehicles have no back-up and they are currently working at or near their maximum capacity. Based on a brief analysis there is a need for a second 15 m^3 rear load compactor, a third skip truck to serve as back-up to the two existing old trucks and smaller capacity compactor truck to service the narrow street residential areas as they are resettled. The transition will also bring a need for more containers.

Solid waste collected in the city by the DPW is dumped at the city landfill. This site is nearing its maximum capacity and a new site will be needed in the near future. The existing landfill was inspected during our brief visit and found to be in fair condition. The waste is compacted regularly and a layer of cover soil is applied once per week, by a bulldozer which appears equivalent to a Caterpillar D7.

One disturbing incident was observed at the landfill. A pile of burning refuse was observed, separated from the active face of the landfill. Upon close observation it was concluded that this was mixed waste from the City hospital. Syringes, bandages and general medical waste could be observed in addition to IV bottles and empty drug vials. This method of medical waste disposal constitutes a significant health threat. DPW officials indicated that this was common practice since the hospital is not equipped with a medical waste incinerator. USAID strongly recommends the installation of a medical waste incinerator at the city hospital along with special handling procedures for all medical wastes. In the interim, medical waste should be buried at the landfill in a separate area and covered immediately.

Septage Pumping

Prior to the war the DPW was responsible for servicing approximately 1,000 septic tanks in homes that were not connected to the central wastewater sewer system. During the war, the DPW septage pump trucks were taken to Yugoslavia and not returned. The private septic tanks are now emptied by their owners, with the contents spread on fields, dumped along the roadsides or in small streams. Since septage can be the source of disease and infections if not handled properly, the current situation is a significant health threat.

The replacement of the original septage hauling trucks is strongly recommended. A 12 m^3 vacuum truck should handle the demand for septage pumping with adequate scheduling throughout the year.

Street Sweeping

Prior to the war, Vukovar had two mechanical street sweepers. These were taken during the war and there whereabouts is unknown. Street sweeping is currently done manually in the downtown areas, but in general, other municipal streets are not swept. As the population begins to return to Vukovar during the transition, there will be an increasing demand to replace at least one of the mechanical sweepers.

USAID Recommendations

The fact that the streets are relatively clean and litter is only a minor problem is testimony to the positive environmental awareness of the people. Although public health services are being performed in the city, these services will come under increasing pressure as the transition begins. It is anticipated that solid waste collection will be a critical issue as the population returns and reconstruction activities increase the volume of waste needing disposal. Therefore there is an immediate need for addition waste collection vehicles as outlined above.

Street sweeping and pumping of septic tanks are two potential problem areas but are not considered immediate threats. Manual street sweeping can continue and even be expanded in the down town areas and periodic cleaning of outlying areas could be performed using existing resources. In the short term, individual cleaning of septic tanks could continue with a little additional control and monitoring by the city. Although a new septage truck is recommended it has a lower priority than other items.

Summary

Recommended equipment purchases and their estimated costs are listed below in order of their priority:

(1) 15 m^3 compactor truck	$125,000
(2) 9 m^3 compactor truck	$90,000
(3) Skip truck	$40,000
(4) Medical waste incinerator	$100,000
(5) 12 m^3 septic tank truck	$125,000
(6) Mechanical street sweeper	$200,000

ANNEX B.3

ENGINEERING REPORT
ELECTRICAL DISTRIBUTION IMPROVEMENTS

System Description

The supply of consistent, dependable electric power is an essential requirement of any community. Unfortunately, during the war, electric transmission facilities were a strategic target and most facilities serving Vukovar were severely damaged or destroyed. This included primary and secondary line transformers as well as transmission cables and towers.

The primary high voltage transmission system prior to the war is shown on Figure B.3. Vukovar's primary transformer station, Vukovar-2, was fed with three 110 Kv lines. Vukovar-2 included two 110/35 Kv transformers and two 35/10 Kv transformers. This primary station fed 35 Kv to three other 35/10 Kv transformer stations. Line voltage at 400 volts was supplied to system users by approximately 25 10/0.4 Kv line transformers.

Current Situation

Nearly all of the transformer stations in Vukovar were either damaged or totally destroyed during the war. Since the war, the power company has restored limited service to the priority areas of the city and the Borovo complex, through temporary means, maximizing the remaining transformer and line capacities. Current demand is at or near the existing transformer capacity and significant problems are anticipated this winter if major repairs are not completed. Many people rely on electric heat during the winter and essential public services such as police, medical care and fire protection rely on the availability of adequate electric power to maintain these services.

The critical facility in increasing capacity is the Vukovar-2 station. Only one of the two 110/35 Kv transformers has been repaired and placed back into service, using a single 110 Kv feed line from Yugoslavia. The second 110/35 Kv transformer has been repaired and is reportedly "ready to go", but due to limited resources, the power company is unable to provide the needed switch gear, breakers and metering devices needed to place it into service. In addition to the 110/35 Kv transformer switch gear, the second 35/10 Kv transformer was totally destroyed and must be replaced along with its related switch gear, breakers and metering devices. Without these improvements, the power company can not feed any more electricity into the local distribution system.

Of the three 35/10 Kv transformer stations fed by Vukovar-2, two stations, Vukovar-1 and Borovo, have been restored to full service. Vukovar-3, located outside of Vukovar to the southeast is at 50 percent capacity, with only one of two 35/10 Kv transformers having been restored. The second transformer was totally destroyed. Since the area served by Vukovar-3 received major damage during the war, which has not been rebuilt, the 50 percent capacity is currently adequate to meet demands, but the second transformer will be needed if reconstruction proceeds as scheduled. The power company has not prepared a description or cost estimate for this station.

Most of the 25 10/0.4 Kv line transformers in Vukovar received varying amounts of damage during the war. Some have been repaired and placed back into service while others have not.

Figure B.3
Primary Power Distribution—Vukovar

Some transformers served areas which have been totally destroyed by the shelling and have not been rebuilt. In other areas, power lines have been extended long distances from operating 10/0.4 Kv transformers to serve areas where transformers have been destroyed and not replaced. While this has restored power, acceptable distribution distance standards have been exceeded, resulting in frequent overheating of lines, interruptions of service and voltage variations.

This is the current situation in the downtown area where the local transformer was totally destroyed. Service has been extended to this area from operating transformers serving several adjoining areas. This area includes the police station, municipal offices, hospital, kindergarten and secondary schools, and an indoor market. During this past winter, the power company was barely able to maintain service, with many interruptions and voltage problems. Maintaining power to the hospital was especially difficult. Considering the amount of expansion and rebuilding anticipated this summer in the downtown, it is certain that the system will not be able to provided adequate dependable power this winter.

In addition to the downtown 10/0.4 Kv transformer station, the power company identified 4 other 10/0.4 Kv stations, of the 25 total, with a high repair priority, but the downtown station is by far the most critical.

Power Company Recommendations

The power company has identified two high priority projects that need to be completed by this winter if service is to be maintained. These include repairs and reconstruction at the Vukovar-2 primary transformer station, and reconstruction of the downtown 10/0.4 Kv transformer and related cables and wires to transmit 10 Kv power from Vukovar-2 to the new transformer and 400 volt wires to connect commercial and residential users. Subject to available funding, one or more of the remaining four high priority 10/0.4 transformers should also be restored.

Vukovar-2

A detailed description and cost estimate has been prepared by the power company covering the proposed work at Vukovar-2. These include major switch gear, breakers and metering equipment to operate the transformers and distribute power to the other transformer stations in Vukovar. The work will also add redundancy to the station operation and reduce the potential of outages and voltage variation.

The project description and cost estimate includes six categories of work totaling $605,422, broken down into the following categories:

Materials	$552,082
Labor	43,749
Supplies	9,591
Total	$605,422

Employment for approximately 25 workers would be created by the project for a period of 50 days.

Downtown Line Transformer and Transmission Cables

As stated above, the downtown 10/0.4 Kv line transformer was totally destroyed during the war. Nothing remains but a pile of debris. In addition replacing the transformer, the 10 Kv cables running from Vukovar-2 to

downtown will be restored. In order to insure dependable service, individual, dedicated 400 volt lines will be run to the following facilities from the proposed new 10/0.4 Kv transformer.:

— Police station;
— Municipal offices;
— Hospital (2 lines);
— Kindergarten school;
— Secondary economic school; and
— Inside market

The power company has prepared a detailed cost estimate of the proposed work as follows:

- Reconstruct the 10/0.4 Kv transformer

Materials	$91,370
Labor	20,010
Supplies	7,120
Total	$118,500

- Restore 10 Kv cables

Materials	$172,200
Labor	61,500
Supplies	12,300
Total	$246,000

- Restore 400 Kv line wires

Materials	$84,216
Labor	34,216
Supplies	8,932
Total	$127,600
Total Project	$492,100

It is estimated that the project will employ 25 persons for a period of 36 days.

USAID Recommendations

Based on a limited review of the project descriptions, interviews with power company staff and observations in the downtown area, USAID recommends that the two projects as outlined above be completed as soon as possible.

The restoration of dependable power to the community, especially the downtown area containing the city's essential services, will be an important factor in a successful reconstruction program.

The USAID review did not include a detailed technical review of the project descriptions and cost estimates. This should be performed once the donor source has been identified. Particular attention should be directed to individual pieces of equipment and any "source" requirements of the donor. In order to maintain a high level of dependable service, it is essential that transformers, switch gear and other equipment be compatible with the existing station to permit stocking of adequate spare parts needed to address future equipment replacements and emergency repairs. Since the majority of the equipment is made in Croatia and Yugoslavia, equipment provided by donor assistance under the proposed projects should be equal or similar to the existing.

Other Needs

As mentioned earlier, 4 of the remaining 25 10/0.4 Kv transformers are a priority for repair during the reconstruction period. These areas were not visited and the power company provided no description or cost estimates for their repair. It is assumed that these are in residential areas with higher priorities for reconstruction. These should receive a politically neutral review and a schedule prepared for their repair. The costs for repair these stations are estimated at roughly $300,000 each, assuming that they are smaller and less detailed than the downtown station.

The power company expressed a concern over maintenance of the system, especially along transmission lines and transformer stations in remote areas. There is a significant need for several 4-wheel drive utility vehicles to access these areas. Small hand tools and other maintenance items are in short supply.

Summary

Recommended projects in the power distribution system are listed below in order of priority with cost estimates, employment generation and duration.

	Workers	Duration	Cost
(1) New 35/10 Kv transformer and switchgear repairs at Vukovar-2	25	50 days	$605,422
(2) Downtown 10/0.4 Kv line transformer and related transmission lines	25	36 days	$492,100

	Workers	Duration	Cost
(3) Replacement of 4 other 10/0.4 Kv line transformers with related transmission lines (minimum information available)	35	120 days	$1,200,000
(4) Two 4-wheel drive utility trucks and maintenance tools	n/a	n/a	$60,000

ANNEX B.4

ENGINEERING REPORT
DEMOLITION OF STRUCTURES

Existing Situation

Municipal officials have estimated that 800 structures in Vukovar are unsafe and in need of demolition and removal. Since the war, the municipality has demolished 15 buildings in the downtown area but currently available resources have prevented a more intensive program of building demolition. The municipal office for reconstruction anticipates dividing the city into 4 or 5 zones to prioritize the demolition activity. As structures within each zone are inspected and documented, the total number of structures listed for demolition may increase.

The first two zones scheduled for demolition consist of the downtown area. This area is similar to the area to be served by the proposed the downtown power improvements, including a new 10/0.4 Kv line transformer and overhead wires to individual users. Maps of the zones, prepared by the municipality, show each structure to be demolished, along with an inventory of each structure. The inventory lists the location of the facility, the owner, the area of the structure in square meters and the number of stories. The current inventory lists approximately 150 buildings to be demolished in the first two downtown zones. These are mostly two-story buildings that housed commercial businesses and probably residential flats above, on the second floor.

The inventory of buildings to be demolished includes photographs of the buildings to document conditions before and after the building is demolished. Buildings with historical significance have been identified. Historical buildings that have been judged unsafe by the municipality, and scheduled for demolition have been indicated on the zone map. Photographs have been used to design new facades and other structural features which duplicate the original. The municipality reports that the historical identification and redesign has been completed in the downtown demolition zones.

Since the Croatian government removed the land records to Osijek, ownership has been determined by the current authority using tax records, assuming that the person paying the property tax is the registered owner. The legal validity of the ownership identification should be confirmed before demolition activities proceed. It was reported by the municipality that the majority of the buildings are state owned.

Each private owner, other than the state, should be given sufficient notification prior to the demolition, to allow time for him to remove any items he wishes to retain. Special arrangements should be made to allow an owner to retain ownership of larger special interest items such as doors, windows, wood carvings or carved stone that cannot be removed until demolition occurs. This should not include standard building materials such as bricks, stones, timbers or roof tiles.

Technical Issues

Common Walls

Many of the buildings scheduled for demolition in the downtown zones, share common walls with buildings which are to remain. The contractors performing the demolition must take extra precautions to insure that the buildings to remain are not damaged. This may take additional shoring or other structural measures.

Water and Sewer Pipes

It is assumed that each building to be demolished has its own water and sewer connection. The contractor should be responsible for locating these connections and insuring that the water connection is closed (not leaking), and the sewer connection capped to prevent material from entering the sewer. The contractor should be responsible for preparing an as-built drawing of each structure, documenting the location of underground utilities or other physical features that may effect reconstruction. These drawings should be turned over to the municipal office for reconstruction, who will file the utility locations with the appropriate documentation. If the contractor discovers a leaking water connection he should contact the water company. A water company representative should be assigned to the demolition zone to monitor activities.

Electrical/Telephone Utilities

The demolition activities should be coordinated with the reconstruction of the electrical distribution system in the downtown. If demolition is occurring in an area with live electricity or telephone wires, the contractor should be responsible for protecting these wires from damage and erecting temporary poles to support all live wires. If demolition cannot occur due to electric or telephone wires, then these utilities should be given prior notice so that the wires can be re-routed by the power company to permit the demolition to proceed.

Recycled Construction Materials

It was reported by the municipality that many of the bricks in the older historic areas of the city are solid and can be recycled for reuse. The ownership and disposition of these bricks and other materials salvaged from the demolition debris should be established in the tender documents or project specifications. If the contractor is to retain ownership of all materials, he should include an offsetting price in his cost to perform the demolition. An alternative would be to have the contractor turn over all recovered material to the municipality. However, this would remove the incentive for the contractor to recover these materials and some payment should be given to the contractor to encourage him to remove them.

Hazardous Materials

In the event that hazardous materials are encountered during the demolition process, the contractor should be responsible for notifying public officials and insuring that the materials are properly disposed of. Each contractor should be given minimal training on the identification of hazardous materials and their proper handling. These materials include asbestos, solvents, and petroleum products.

Disposal

The municipality has identified a landfill to receive the demolition waste located approximately five kilometers outside of Vukovar. This landfill was originally intended as a municipal waste landfill but due to its proximity to groundwater and adjacent residential development it will only receive demolition materials. The landfill should be manned during working hours and all loads of demolition material should be recorded.

Measurement and Payment Provisions

Measurement and payment for performing demolition is often a difficult task. The entity overseeing the demolition and payments to contractors must establish a method of measurement and payment in the tender document or project specifications. The following two alternatives are suggested:

- *Unit Price Contract.* Under this type of contract, the contractor is paid a daily rate for each service he provides. The tender document would include prices for labor categories, equipment and other services and is paid those prices. This type of contract requires close supervision to insure that the contractor services are actually provided in an efficient manner.

- *Lump Sum Contract.* Under this type of contract, the contractor is paid a lump sum for each building he demolishes, regardless of the number of workers he uses or the equipment. This type of contract requires less supervision but must have precise performance specifications. A final inspection of the building site determines whether the contractor has met the specification and will be paid the amount that he gave in the tender for that particular building. If the work has not been performed according to specifications then the contractor will not be paid until the work is completed. Since every building will be different in size and construction, the tender documents should include a lump sum price for each building to be demolished.

Equipment

Due to limited resources in Sector East, it is not likely that private contractors or the municipality will have the equipment necessary to perform the demolition activity. Therefore it can be assumed that donor financing will include the provision of equipment as well as labor costs to complete the demolition program. During our brief investigation, we have had several suggestions as to the number of trucks and loaders needed to accomplish the defined demolition program. The actual number of vehicles is a factor of how quickly the demolition of buildings is to be accomplished and what the vehicles will be used for after the demolition has been completed. These issues should be the subject of further discussions between the municipality and the donor.

For the purposes of our budget estimates we have assumed four dump trucks and two front-end loaders. This is based on estimates for completing the demolition within a reasonable time frame and integration of the equipment into the public works department. The sizes and types of vehicles should be the result of mutual negotiations between the municipality reconstruction office, the department of public works and the donor agency acting through or in cooperation with USAID.

Ownership and security for the equipment is a significant issue especially during the transition period. Due to the political issues which are expected to arise during the transition period, it is advisable that a third party assume ownership and security responsibility for the equipment. The obvious choices for ownership are UNTAES or the donor, with transfer to the municipality at the conclusion of the transitional period.

In addition to the major equipment needed to load and haul demolition material to the landfill, there will be a significant need for smaller machines and hand tools to perform the work. Hydraulic jack hammers to break up concrete or other masonry, torches to cut reinforcing steel, sledge hammers, pick, shovels, etc., will all be needed to complete the work.

Cost Estimate

The municipality has prepared a cost, manpower, and project duration estimate for the first two zones of the demolition program. This estimate included only equipment and labor costs and in our opinion is significantly low. We have revised the estimate to include other items such as fuel, equipment maintenance and small tools. This estimate assumes that the equipment will be purchased new and fully amortized over the short 90 day life of this project. If used equipment is procured or if the equipment is amortized over a longer period, covering other uses, the estimate for this project would be significantly less.

Major Equipment		
4 Dump Trucks @ $50,000 each	$200,000	
2 Loaders/backhoes @ $75,000 each	150,000	
Spare Parts @ 10%	35,000	
		Subtotal $385,000
Other Equipment/Costs		
Small tools, torches, hydraulic hammers	$80,000	
Fuel, equipment maintenance, repairs	22,000	
Administration, vehicle insurance	10,000	
Utilities, communications	5,000	
		Subtotal $117,000
Labor	$120,000	
		Total Project Cost $622,000

It is estimated that the project will provide employment for 120 workers for a period of 90 days.

Contracting Process

Although this applies to the water and power projects as well, the contracting process is especially pertinent to the demolition project, because it involves a large manpower force and significant equipment resources. Previous UNTAES program descriptions suggests a standard open bidding process would be used for these projects. Since most of the region was formerly under communist rule, most large companies are state owned, with very few private companies, especially in the construction trades. With this in mind it may be difficult to secure this work using a typical contracting process.